

# Establishing and coppicing dense downy birch stands for biomass production on cut-away peatlands

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## Introduction

Peat is used for energy in Finland. At present 2500 ha of peat production areas are released annually. One re-use option would be to continue energy production with different energy crops since the need for reducing greenhouse gas emissions is increasing the value of renewable energy obtained from forests. Birch could be suitable species for energy forestry in Finland.

## Results



**Fig. 1.** Establishment of birch was successful on ash-fertilized cut-away peatlands (50 000 to 100 000 seedlings ha<sup>-1</sup>). In the picture two year old birch seedlings. (Photo: J. Hytönen).



**Fig. 3.** Three year old birch sprouts. (Photo: J. Issakainen).

## Material and methods

\* Cut-away peatland sites are located in central Finland.

\* We studied:

- establishment of birch thickets by natural seeding and broadcast seeding
- growth of coppiced birch stand that was clear-cut at the age of 16 years and grown for 21 years after coppicing

\* Fertilization treatments were:

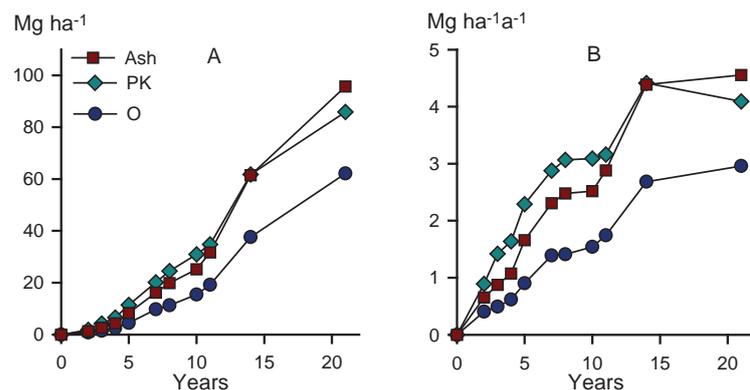
- control
- PK fertilization (P 50 and K 95 kg ha<sup>-1</sup>)
- wood ash fertilization 5,000 kg ha<sup>-1</sup> (P 108, K 339 and Ca 1,065 kg ha<sup>-1</sup>)

\* We measured:

- seedling numbers
- biomass production using biomass equations



**Fig. 2.** The 16-year-old birch thickets that was clear cut had mean annual increment (MAI) of 4.4 t ha<sup>-1</sup> a<sup>-1</sup>. No fertilization or silvicultural measures. (Photos: S. Kaunisto and L.Aro).



**Fig. 4** The development of above-ground biomass after coppicing. Fertilization increased significantly (23–33 t ha<sup>-1</sup>) biomass production of birches during 21 years (A). The MAI increment of the 21-years-old fertilized stands varied between 4.1–4.6 t ha<sup>-1</sup> a<sup>-1</sup> (B).

## Conclusions

According to our results dense birch stands can be established naturally or by using broadcast seeding on ash-fertilized cut-away peatlands. The areas are suitable for biomass production and quite a high mean annual increments can be reached by growing birch. Thus native birch could be attractive option to short-rotation willows or reed canary grass cultivation and bind considerable amounts of atmospheric carbon. However, for maximizing birch biomass production the rotation period should be much longer (20–30 years) than with willows.

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